

Notes on the phytophagous habit of some
Chalcidoids, with descriptions of two
new species.

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Among the Chalcidoidea known as parasitic in majority upon various species of insects are found numerous species which are of a phytophagous character. They are the species which belong to the following families: Agaonidae, Callimomidae (Torymidae), Eurytomidae, Eulophidae, Encyrtidae and Pelilampidae. As regards the origin and evolution of the phytophagous habit A. B. GAHAN, in 1922, puts forward the view that the phytophagous habit is in all probability of recent development, and partial phytophagy may be first forced upon the parasite by the premature exhaustion of the natural food supply due to attacking a host which is insufficient in itself to furnish food for complete development. This view is based on the facts that the phytophagous species, so far as is known, belong almost exclusively to the group including a large percentage of the related parasitic forms which breed in host larvae within the plant tissue, and that certain species of the Eurytomidae are parasitic in their early stages and pursue their development as plant-feeders, indicating the transition from a parasitic to a phytophagous existence.

Some years ago I reared a species of the genus *Decatoma* from the seed of *Smilax china*, which is placed on record as a new species in this note, naming it *D. similacis*. Its larva has the

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tridentate mandibles which are very similar in shape to those of the larvae of the most phytophagous Cynipoids. Moreover the adults of *Decatoma* are not merely very similar to those of the Cynipoids in the possession of much compressed abdomen but in general appearance as well. From these facts I am inclined to think, as W. H. ASHMEAD, that the ancestral Chalcidoid-type is in all probability evolved from some ancestral Cynipoid-type and of a phytophagous character, and that the most primitive group of the present Chalcidoidea is Eurytomidae in the family and *Decatoma* in the genus.

As is well known, there are in the phytophagous Chalcidoids many species which infest seeds. This fact appears to me to suggest that the most ancestral Chalcidoids were probably seed-feeders, and they might be transformed into forms infesting insects, leaving a few forms still phytophagous.

The evolution of the phytophagous habit of the species belonging to such a higher group as Eulophidae can be explained either by the facts that they are to a considerable degree capable of adapting themselves to different environmental conditions or by A. B. GAHAN'S view cited above, but not by the view just given.

Decatoma smilacis, n. sp.

Female.—Black in general. Face and mandibles brownish red in lower parts exclusive of the black tip of the latter. Maxillary and labial palpi pale yellow. Antennal scape yellow; pedicel brown; funicle joints and club black. Propleurae reddish brown; tegulae pale yellow; abdomen shiny black. Wings hyaline except the basal parts which are infuscated; veins pale brown except the marginal vein which is dark brown. Coxae dark brown; femora dark brown except the tip and base; the remaining parts of legs

whitish yellow.

Head much wider than deep (67:50); frontovertex at the anterior ocellus about two-thirds the width of the head; ocelli arranged in an obtuse-angled triangle, the posterior paired ones apart from each other by about twice as large as their own diameter. Antennae situated slightly above the middle of the face, about 1.4 mm. long, composed of 9 joints exclusive of one ring joint; scape rather short, considerably swollen in the basal half; pedicel as long as wide; funicle joints subcylindrical, longer than wide, first joint twice as long as wide, second and third joints as long as and slightly wider than the first, fourth and fifth joints almost equal in length and width, slightly shorter than the third, sixth joint slightly shorter than wide and the fifth; club entire, considerably shorter than the last two funicle joints combined; funicle joints and club with considerably long grey hairs in sparse numbers.

Scrope moderately deep, reaching just below the anterior ocellus; toruli round, separated from each other by two-thirds their own diameter; a small protuberance between the toruli; clypeal margin with two projections. Mandibles (Fig. 1) tridentate, the upper tooth truncated at tip and the lower two teeth sharp and almost equal.

Pronotum twice as wide as long; mesoscutum considerably longer than the pronotum; parapsidal furrows distinct; propodeum with a longitudinal furrow which has about six transverse ridges.

Abdomen as long as the head and thorax combined; petiol much shorter than the hind coxa; visible first abdominal segment long, about as long as the fourth; second segment half as long as the first or the third; segments 5-7 very short.

Fore wings 3 mm. long by 1.4 mm. wide, uniformly ciliated without the basal third; submarginal, marginal, stigmal and post-marginal veins (Fig. 3) approximately in the ratio of 85:17:15:8;

marginal vein considerably thickened; submarginal vein with about 27 bristles. Hind wings 2 mm. long by 0.6 mm. wide and uniformly ciliated without the basal third.

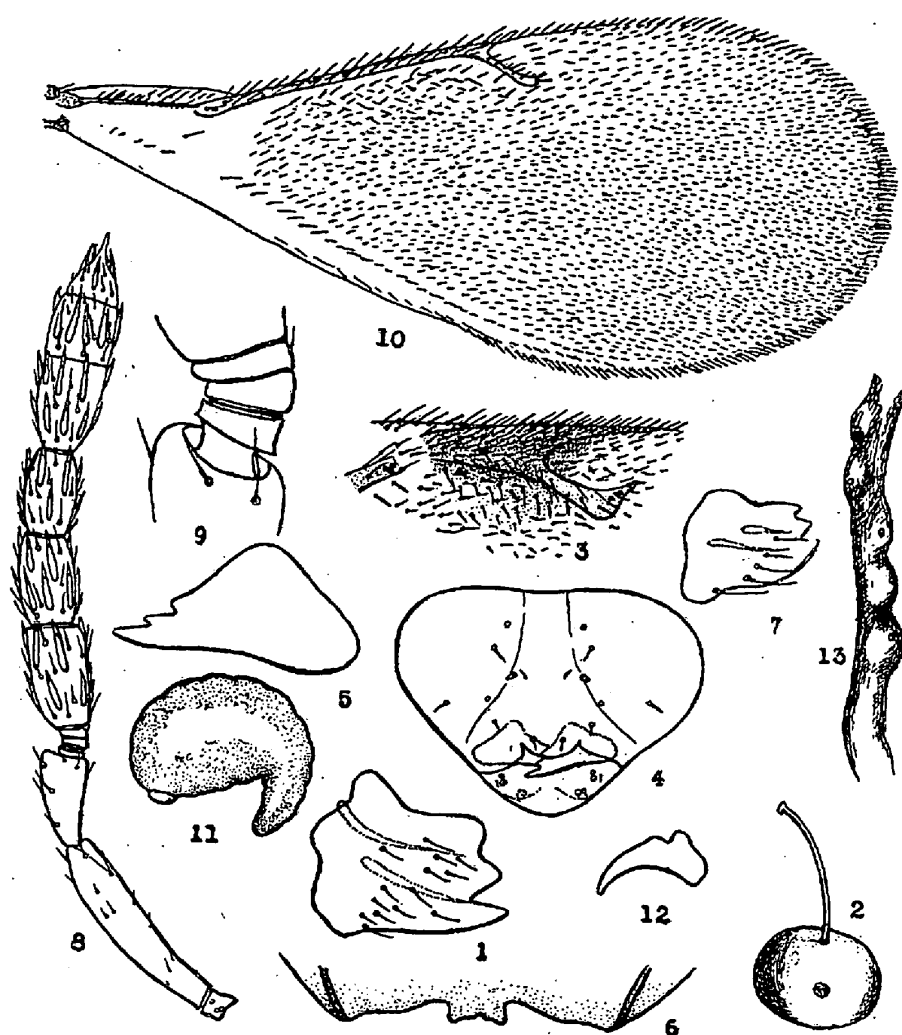
Head and mesonotum marked with closely set, moderately large umbilicate punctures; face with about seven oblique striae on each side, which are connected together at the middle of the face. Abdomen smooth; segments 6-7 minutely reticulated and with fine grey hairs in sparse numbers. Length of body 3.7-4 mm.

Male.—Almost similar to the female except the following characters:—Antennae 2 mm. long, composed of 9 joints exclusive of one ring joint; scape rather stout and considerably swollen below the middle; pedicel as long as wide at apex; funicle joints cylindrical, much longer than wide, decreasing in length and width distads, first funicle joint thrice as long as wide, last funicle joint twice as long as wide; club entire, slightly narrower and longer than the last funicle joint and with long grey hairs in sparse numbers. Abdominal petiole much longer than the hind coxa. Head yellowish red except the frontovertex which is dark brown. Femora yellowish red-brown. Length of body 3.5-4 mm.

This species may be distinguished from any of other forms by the possession of marginal vein not well developed as well as by different coloration. Its mature larva has the following characters:—Spindle-shaped, translucent white, with sparse numbers of minute hairs. Mandibles (Fig. 5) stout, distinctly tridentate and about 0.15 mm. long by 0.21 mm. wide. Body 4 mm. in length and 2 mm. in width.

This species has one generation in a year, hibernating in the stage of mature larva in the seed of *Smilax china* (Fig. 2). The adult appears in the middle of May and deposits eggs in new seeds.

This species was collected in the district of Nagasaki in 1925.



Decatoma similucis, n. sp.

Fig. 1. Mandible of female. Fig. 2. Seed of *Smilax china* showing a hole of emergence. Fig. 3. Veins of fore wing of female. Fig. 4. Head of mature larva. Fig. 5. Mandible of the same.

Tetrastichus ardisiae, n. sp.

Fig. 6. Clypeal margin of female. Fig. 7. Mandible of female. Fig. 8. Antenna of the same. Fig. 9. Ring joints of antenna of the same. Fig. 10. Fore wing of the same. Fig. 11. Mature larva. Fig. 12. Mandible of mature larva. Fig. 13. Shoot of *Ardisia japonica* showing holes of emergence.

Tetrastichus (Geniocerus) ardisiae, n. sp.

Female.—Black in general; head, pro- and mesonotum, metapleurae and abdomen with a slight blue reflection; tegulae brown; visible first abdominal segment reddish brown. Antennal scape yellowish brown; pedicel brown; funicle joints and club dark brown. Wings hyaline; veins pale brown. Coxae black; femora brown except the tip and base; the remaining parts of legs pale yellow.

Head a little wider than deep (35:31); ocelli in an obtuse-angled triangle, apart from one another by four-sevenths the width of the head at the anterior ocellus, the posterior paired ones separated from each other by one and half their own diameter. Scrobe longitudinally oval in shape, moderately deep, including the anterior ocellus; clypeal margin as shown in Fig. 6; mandibles (Fig. 7) tridentate. Antennae (Fig. 8) situated at the middle of the face, 0.83 mm. in length, made up of 8 joints exclusive of four ring joints (Fig. 9); scape subcylindrical; pedicel twice as long as wide at apex; first, third and fourth ring joints nearly equal in length; second very short; funicle joints subcylindrical, the first joint twice as long as wide, second slightly shorter than the first and as long as the third; club 3-jointed, slightly longer than the last two funicle joints combined. Pronotum short with about 12 bristles near the posterior margin; mesoscutum with a median groove; 6 bristles on each side along the inside of the parapsidal furrows; scutellum subquadrangle in shape, slightly convex and with the longitudinal parallel lines; 2 bristles on each side of the scutellum; propodeum with a median keel. Abdomen conic-ovate in shape, as long as the head and thorax combined; first abdominal segment considerably longer than the other segments which are subequal in length.

Fore wings (Fig. 10) 1.8 mm. long by 0.75 mm. wide and uniformly ciliated except the basal third which is almost bare; submarginal, marginal, stigmal and postmarginal veins approximately in the ratio of 18:45:9:2; submarginal vein with 7 bristles. Hind wings 1.35 mm. long by 0.33 mm. wide and uniformly ciliated except the basal fourth.

Head, pro- and mesonotum, pleurae and propodeum minut-scaly reticulated; mesoscutum and scutellum longitudinally reticulated in minute scales; abdomen weakly reticulated. Length of body 2.5 mm.

This species may be distinguished from others by the possession of 4 ring joints. Its mature larva (Fig. 11) has the characters as follows:—Translucent white; head small; mandibles (Fig. 12) edentate, about 0.045 mm. in length; body abruptly tapering at the posterior third, measuring 1.8 mm. in length and 1 mm. in width.

This species passes one generation a year, hibernating in the larval stage in the shoot of *Ardisia japonica* (Fig. 13). The adult appears from the end of April till the end of May and deposits eggs in new shoots. As the larval development goes on, the portion of shoot in which it lives swells to some extent, as is shown in Fig. 13.

This species was collected in a wood near Nagasaki in 1925.

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